

CLAIMS

1. A solid polymer fuel cell, comprising:
an electrolyte membrane (2); and an air electrode (3) and
a fuel electrode (4) which closely contact to opposite sides
of the electrolyte membrane (2) respectively, characterized
in that the electrolyte membrane (2) has a membrane core (9)
comprising a polymer ion-exchange component, and a plurality
of phyllosilicate particles (10) that disperse in the
membrane core (9) and are subjected to ion-exchange
processing between metal ions and protons, and that proton
conductance P_c satisfies $P_c > 0.05 \text{ S/cm.}$
2. A solid polymer fuel cell according to claim 1, wherein
particle size d of the phyllosilicate particle (10) satisfies
 $0.001 \mu\text{m} \leq d \leq 2 \mu\text{m}$ and ion-exchange capacity I_c satisfies
 $0.5 \text{ meq/g} \leq I_c \leq 2.0 \text{ meq/g}$, and its particle content L
satisfies $L \leq 10\%$ by weight.
3. A solid polymer fuel cell, comprising: an electrolyte
membrane (2); and an air electrode (3) and a fuel electrode
(4) which closely contact to opposite sides of the
electrolyte membrane (2) respectively, characterized in that
the air electrode (3) and fuel electrode (4) have a plurality
of catalytic particles, a polymer ion-exchange component,
and a plurality of phyllosilicate particles.
4. A solid polymer fuel cell according to claim 3, wherein
the phyllosilicate particles are at least either smectite
mineral particles or synthetic mica particles.

5. A solid polymer fuel cell according to claim 4, wherein the smectite mineral particle is at least one kind selected from montmorillonite, saponite, hectorite, stevensite, and vermiculite, and the synthetic mica particle is at least either fluorotetrasilicic mica or teniolite.

6. A solid polymer fuel cell according to claim 3, 4, or 5, wherein content L of the phyllosilicate particles satisfies $L \leq 10\%$ by weight.

7. A solid polymer fuel cell according to claim 3, 4, 5, or 6, wherein ion-exchange capacity I_c of the phyllosilicate particles satisfies $I_c \geq 0.5 \text{ meq/g}$.

8. A solid polymer fuel cell according to claim 3, 4, 5, 6 or 7, wherein aggregation diameter D of the phyllosilicate particles satisfies $D \leq 100 \mu\text{m}$.

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